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ROBERT H. BYZEWSKI
LT COL, USAF

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325 CHENNAULT CIRCLE
MAXWELL AFB AL 36112-6427

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NATIONAL DEFENSE STOCKPILE: MODERNIZATION OR SUICIDE?

by

Robert H. Byzewski

Lieutenant Colonel, USAF

A RESEARCH REPORT SUBMITTED TO THE FACULTY

IN

FULFILLMENT OF THE CURRICULUM

REQUIREMENT

Advisor: Colonel Thomas M. Wellman

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March 1994

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ABSTRACT

TITLE: National Defense Stockpile: Modernization or Suicide?

AUTHOR: Robert H. Byzewski, Lieutenant Colonel, USAF

The National Defense Stockpile, composed of 91 strategic materials valued at approximately $8.9 billion, contains less than half of the total three-year supply directed by Congress in the 1979 Strategic and Critical Materials Stockpiling Revision Act. The Department of Defense is currently in the process of effectively reducing the size of the stockpile to approximately $444 million. This massive reduction is based upon the assumption that the United States will have three to five years warning of any future national emergency and will be able to replenish any needed minerals. While stockpile contents should be updated to keep pace with technology, this massive reduction is potentially a form of suicide if these critical minerals are not available in a time of national emergency.

BIOGRAPHICAL SKETCH

Lieutenant Colonel Robert H. Byzewski (M.A. Webster University) has tracked the activities of the National Defense Stockpile since 1989. He is a command pilot with more than 5,000 hours in KC-135, B-52G, B-52H, and B-1B and was a member of the first operational B-1B squadron. From 1989 to 1992 he was assigned as B-1B Program Element Monitor and Chief, Bomber Conventional Forces Branch, Headquarters United States Air Force. He commanded the 93d Operations Support Squadron from 1992 to 1993. Colonel Byzewski is a graduate of the Armed Forces Staff College and is a 1994 graduate of the Air War College.

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NATIONAL DEFENSE STOCKPILE: MODERNIZATION OR SUICIDE?

I. INTRODUCTION

Following the events of World War II, during which the United States was severed from its critical foreign mineral sources, Congress passed the Strategic and Critical Materials Stockpiling Act of 1946. The act was to prevent "a dangerous and costly dependence of the United States upon foreign nations for supplies of these materials in times of national emergency."[1] Congressional direction regarding stockpiled minerals has been measured in terms of years of mineral supply on hand based on estimated wartime consumption. The 1946 goal of a five-year supply was reduced in 1958 to a three-year supply which was later reduced to a one-year supply in 1970 and subsequently increased to a three-year goal in the 1979 Strategic and Critical Materials Stockpiling Act. The current National Defense Stockpile, containing 91 strategic materials valued at approximately $8.9 billion, is less than half of the three-year goal established by Congress in 1979. If the full three-year supply was contained in the stockpile, the total dollar value would exceed $19B.[2]

In 1988, duties of managing the stockpile were reassigned from the Federal Emergency Management Agency to the Department of Defense (DoD).[3] In 1992, when faced with dwindling defense

budgets in a post-Cold War era, where warning times are reportedly measured in terms of years vice hours, the DoD attempted to "modernize" stockpile requirements.[4] Even though directed by Congress to maintain a three-year stockpile, DoD stated that its requirements were only $3.3 billion and by 1993, the DoD stated its requirements were only $444 million.[5] Concurrent with the Department of Defense defining its own requirements, in apparent opposition to the 1979 Stockpiling Act, DoD began a campaign to gain approval to sell-off many of the minerals maintained in the stockpile.

While the Cold War is over, the former Soviet Union is no longer a monolithic threat, and warning times are reportedly measured in years vice hours, should the stockpile be reduced to a mere fraction of its present status? Is the proposed massive reduction of stockpiled materials really modernization or is it potentially suicide--suicide which is being driven by a myopic view of the world where the stockpile presents a lush source of revenue to supplement budget reductions? These questions will be examined in-depth to determine if the National Defense Stockpile will be capable of providing the critical minerals necessary for the defense of the United States in times of national emergency.

II. BACKGROUND

Before beginning a discussion of the how the stockpile came into being and how it has change~~s~~d over the past 48 years, it is important to explain that in all cases, Congress has mandated levels in the stockpile based upon a "goal." This goal has been expressed in terms of number of years of supply of minerals based on certain wartime assumptions. The assumptions directed by Congress, and the President in some cases, have varied over the course of time but, generally included such assumptions as level of mobilization, proposed Gross National Product, reliability of foreign sources, expected losses to shipping, length of warning for buildup of forces prior to engagement, and availability of minerals in North America. These "goals," are often converted to dollar amounts for a given year to assess the investment that is required or will need to be made to reach the goal. Where the term "requirement" is used, it generally refers the quantity of a minerals (usually in dollars) required to meet the goal. It would be expected for requirements to be synonymous with goals, however, the following discussions will demonstrate why this is not the case.

The Strategic and Critical Materials Stockpiling Act of 1946 provided for the purchase and retention of a five-year stock of critical materials and encouraged the development of these materials within the United States.[6] The 1946 Act was to set the stage for ensuring that the United States would never again be severed from access to critical materials as it was

during World War II. During the late 1950's, doubts were expressed about the possibility of fighting a long conventional war in an age of nuclear weapons. This new nuclear strategy resulted in Congressional reevaluation of the stockpile goals and in 1958, the previous five-year goal was reduced to a three-year goal.[7]

Major policy changes in 1970 further reduced the stockpile goal to a one-year supply. This one-year goal was attacked by logistics experts who claimed it was based on extremely optimistic assumptions about supply lines.[8] These experts gained widespread attention by exposing the dangers of overly optimistic planning and reducing the stockpile to a one-year goal. At the same time, Congress was busy with its own campaign of exposing the plan as a shortsighted means to use stockpile sales to reduce the federal deficit. The result was the Strategic and Critical Materials Stockpiling Revision Act of 1979, which added new materials to the stockpile, reinstated the previous three-year stockpile policy, and prohibited the stockpile from being used for budgetary reduction purposes.[9]

As technology and military strategy continued to change, so did the methods for computing the quality and quantity of materials to be stockpiled. In 1985, the National Security Council (NSC) released the results of an extensive study of stockpiled materials which constituted 97 percent of the Congressionally-directed three-year stockpile goal of $16.1 billion. The NSC study recommended an alarming reduction of the Congressionally-directed goal to only $700 million with 30 of

the materials being completely eliminated.[10] Congress blocked all attempted reductions at that time and reiterated the requirements stated in the 1979 Stockpiling Act.[11]

In 1988, the President transferred the duties of manager of the National Defense Stockpile from the General Services Administration and the Federal Emergency Management Agency to the Secretary of Defense.[12] Congress simultaneously established the requirement for an annual report from the Secretary of Defense concerning United States needs for strategic and critical materials in the context of a three-year, global, conventional war scenario.[13]

By 1992, images of the previous Cold War were blurred with realities of a dwindling defense budget. As a result, Congress approved the sale of large quantities of 26 strategic minerals including cobalt, ferrochromium, platinum, manganese, and ferromanganese, for which the U.S. relies almost entirely on imports.[14] In addition, the Department of Defense "1993 Report to the Congress on National Defense Stockpile Requirements" estimated that overall stockpile goals will be further reduced (from the 1992 goal) by 87% due to changes in the economic and military assumptions being used. The new goals, if approved, will reduce the estimated dollar value of critical materials required in the stockpile to $444 million.[15]

III. WAR SCENARIO ASSUMPTIONS

As the possibility of fighting an extended global war flickered very dimly on a far distant horizon, the stockpile began to be viewed as a lush source of revenue to decrease the national debt. As Congress remained staunchly opposed to any reduction of the stockpile below the three-year requirement, new avenues were sought to circumvent the mandate while "technically" remaining in compliance. The method used to accomplish this feat was to use previous planning assumptions in a far more optimistic manner.

1985 National Security Council Study

In June 1985, the National Security Council (NSC) announced the results of an extensive two-year study that examined 45 stockpiled materials, which constituted $15.6 billion (97 percent) of the total mandated three-year stockpile goal of $16.1 billion. The NSC study recommended an alarming reduction of the stockpile goal to only $700 million, with 30 of the materials being completely eliminated.[16] Congress, however, blocked all proposed stockpile reductions at that time.

The 1985 NSC study is significant because it highlighted how overly optimistic planning assumptions could significantly reduce the overall stockpile goal while simultaneously complying with the three-year requirement. Major changes in assumptions by the NSC study include decreased level of mobilization, altered war scenario, increased reliability of foreign sources, and decreased Gross National Product.[17]

Even though President Reagan, in National Security Decision Directive Number 47, directed the military to be able to "expand the size of the force from partial through full to total mobilization," the NSC officials only planned for full mobilization because they viewed total mobilization planning as "unrealistic."[18] By limiting the scenario to a lower level of mobilization, the size of the planned force would be smaller, the amount of equipment and supplies required would be less, and thus the requirement for critical materials would also be less. In addition, the NSC altered the normally accepted wartime scenarios developed by the Joint Chiefs of Staff and developed a composite scenario of its own where the intensity of the war diminished significantly after the first year rather than in three years.[19]

The NSC study was also overly optimistic regarding the reliability of foreign sources. Of the 39 countries that the U.S. received imports from, 17 more sources were rated as highly reliable than the previous stockpile planning study completed in 1982. These reliability ratings were increased even though State Department inputs were to the contrary.[20] Increasing reliability ratings decreased stockpile requirements.

Economic assumptions made by the NSC study showed annual increases in the Gross National Product (GNP) that were much smaller than annual GNP increases during both the Korean War and World War II. In addition, the NSC study used a GNP growth rate that was approximately one-half that used by previous studies. GNP growth is significant because it has the effect of

increasing overall stockpile requirements due to defense industry production. Reduced GNP estimates could have the effect of decreasing stockpile goals below the critical level needed during an emergency and thus place the United States in a critical position.[21] The combined effects of these overly optimistic planning assumptions, as will be shown in the next section, are much greater than the sum of the whole. They were used in this instance to reduce stockpile requirements to as low as $700 million and still fulfill the three-year requirement mandated by Congress.[22]

1989 Institute for Defense Analyses Study

The combined effect of altering planning assumptions is dramatically seen in the stockpile requirements model created by the Institute for Defense Analyses (IDA) in 1989 for the Office of the Assistant Secretary of Defense for Production and Logistics(OASD P&L).[23] The model combined the best available data and planning factors to project requirements for critical materials in a major conflict scenario. Of the 49 minerals examined in the IDA 1989 Base Case analysis, a total of 22 minerals were identified which had sources of production which were unlikely to meet U.S. demands in the emergency scenario.[24] At 1989 market prices, the estimated dollar value of these shortfalls was approximately $4.29 billion. The largest shortfalls included titanium, chromium, bauxite, tantalum, and cobalt. Shortfalls in these five minerals alone constituted approximately 80 percent ($3.376 billion) of the total estimated

in the Base Case. Table 1 contains the 1989 Base Case shortfalls. IDA estimates were based on year-by-year comparisons of demands by the defense and civilian sectors of the U.S. emergency economy with anticipated supplies of these materials from U.S. and reliable foreign producers. The IDA calculations required that defense demands be met by producers deemed exceptionally reliable whereas civilian demands could be met by any remaining assured supplies after defense demands were met. In addition, production could only be used to meet demands if it occurred on a timely basis. Stated differently, early production could be used to offset later demands however, later production could not be used to offset earlier demands.

TABLE 1
1989 BASE CASE SHORTFALLS ($ Millions)

		SECTOR		
MATERIAL	TOTAL	DEFENSE	INDUSTRIAL	CIVILIAN
Antimony	207	190	2	15
Bauxite	475	474	1	0
Beryl	7	2	1	4
Chromium Gp	634	487	47	100
Cobalt	360	348	12	0
Columbium	50	47	3	0
Germanium	46	45	1	0
Graphite	9	3	6	0
Mercury	12	0	0	12
Mica	3	3	0	0
Platinum Gp	234	85	144	5
Quartz	1	0	0	1
Tantalum	405	279	8	118
Tin	33	18	15	0
Titanium	1502	1496	6	0
Tungsten	316	238	28	50
TOTALS	**4,294**	**3,715**	**273**	**306**

Source: National Defense Stockpile Program.
Phase I: Development and Analyses
Institute for Defense Analyses, March 1990

The results of the IDA study, which the Secretary of Defense forwarded to Congress, also depicted the tremendous sensitivity of the end stockpile goal to a small change in a given planning assumption. For example, a 15 percent change in the material consumption ratio results in a 262 percent increase in shortfall. A 15 percent reduction in assumed U.S. production leads to a 140 percent increase in estimated shortfall. A 25 percent increase in assumed military production demands increases the estimated shortfall by 97 percent. The IDA model also verified that the total predicted shortfall will be much greater than the sum of each individual shortfall.[25] The IDA report was significant not only because it highlighted the effect of overall optimistic planning assumptions, but also because it resulted in a major breakthrough to get the executive and legislative branches pulling together in efforts regarding the stockpile.[26] The major planning factor assumptions used in establishing the Base Case estimates are shown in Table 2. Assumptions in each of the eleven major categories were first proposed and then negotiated in detail with the appropriate Department of Defense and civilian agency officials in building the report.

TABLE 2
BASE CASE ASSUMPTIONS

PLANNING FACTOR	PRINCIPAL ASSUMPTIONS
Nature of Emergency	Major conventional conflict with the Soviet Union and its allies beginning in late 1989
Duration and Warning	One year warning; three-month initial conflict followed by three-year emergency build-up
U.S. Force-Building Targets	Replace losses from initial conflict and expand to planning force levels, including six months of sustainability
Support of Allied-Force Building Goals	General support but no explicit U.S. production to rebuild allied losses
Civil Sector Demands	Consumer durables, residential investment and general non-residential investment decrement based on consens among civil agencies
War Damage	Classified
Trade Conditions	Exports reduced across-the-board 50%; imports reduced an average 30% due to war damage, shipping losses and reliability
General U.S. Production Conditions	
* Production Process Times	* 75% of peacetime
* Shifts	* 3 - 8hr shifts, 5 days per week
* Time to Build New Plants	* 12 month average
* Time to Hire and Train New Workers	* 3 month average

Source: National Defense Stockpile Program.
Phase I: Development and Analyses
Institute for Defense Analyses, March 1990

IV. STOCKPILE CONTENTS

The National Defense Stockpile has grown since 1946 to its present day status of 91 minerals worth approximately $8.9 billion.[27] Many of these minerals which were once considered critical for the defense of the nation, such as vegetable tannin, asbestos, and talc, have become obsolete due to new technology. For others, such as aluminum, bauxite, copper, lead, mercury, nickel, palladium, platinum, silver, tin, vanadium, and zinc, North American sources have been developed and annual production either equals or exceeds consumption.[28]

Even though sufficient domestic production is readily available, large quantities of these materials have continued to remain in the stockpile because the selling of mass quantities of these minerals on the open market would have depressed mineral prices which, in some cases, had already plummeted from market flooding. An excellent example of market flooding is tungsten. China increased its production seven-fold in eight years which resulted in the world price decreasing from $142 to $50 per metric ton by 1990.[29]

While there are many minerals which have domestic sources, this is not true for all minerals. Ferrochromium, ferromanganese, cobalt, and platinum are minerals for which the U.S. relies almost entirely on imports.

Ferrochromium

Ferrochromium is a critical ingredient used to increase the strength, hardness, corrosion resistance and forming characteristics of steel. It is the principal alloying agent in making stainless steel. Ferrochrome is a principal material used in the hot rotating sections of turbine jet engines. In addition, it is used extensively in making furnace linings for the cement and glass industry. Ferrochromium is almost entirely imported.[30] The Republic of South Africa and Zimbabwe contain about 80 percent of the chromium in chromite ore. Smaller percentages are nearly equally distributed throughout Finland, Albania, India, Kazahkstan and Turkey.[31] Even though chromium is not produced in the United States, stockpile holdings are being sold. As technology has progressed, the quality of

chromium required in making high grade stainless steel has risen. A majority of current ferrochromium stockpile holdings are of a low grade ore and are being upgraded to keep pace with defense demands.[32] Congress has subsidized two U.S. companies for the past nine years to upgrade the ferrochromium ore in the stockpile. High quality chromium can be purchased for about $600 per ton, whereas processing to upgrade the ore in the stockpile costs $708 per ton.[33] As public scrutiny increased, Congress approved the purchase of 21,000 tons of high grade chromium and did not approve additional funds for subsidizing chromium upgrade.[34]

Ferromanganese

Manganese, also a critical ingredient in making high grade steel, has a much broader availability. Approximately 43 percent of the world deposits are contained in the former-USSR and South Africa. The remaining largest deposits are held by Australia, 13 percent; Gabon, 12 percent; and Brazil, 10 percent. India and China have less than 5 percent of the world share.[35] As in the case of chromium, Congress has subsidized two U.S. companies for the past nine years to upgrade low quality ferromanganese. As with ferrochromium, the project was not fiscally sound. High grade ferromanganese can be bought at $517 per ton on the open market, whereas processing low grade ore costs $596 per ton.[36] The avenue of fiscal prudence is not always selected by Congress when faced with important constituent issues such as jobs and unemployment.

Cobalt

Cobalt is a strategic and critical metal used in many diverse industrial and military applications, the largest of which is in making superalloys. Superalloys resist stress and corrosion at high temperatures and are ideally suited for use in jet engine parts. Cobalt is also used as a binder in cemented carbides and diamond tools which are used for forming and cutting metal, and is also used extensively in for oil and gas drilling.[37]

While the proposed sale of many minerals has a logical explanation, the sale of cobalt does not. The United States currently has no domestic production, yet consumed about one-third of the estimated world refinery production.[38] In addition, roughly one-half of the world's supply of refined cobalt originates in central Africa, primarily from Zaire and Zambia. While Zaire is the world's largest producer, its production has decreased significantly over the past few years as the result of a major fire, a mine collapse, continuing political stalemate, declining economic conditions, and periodic social unrest.[39] While the price of cobalt has decreased steadily since 1991, the adverse conditions in Zaire have resulted in the highest prices in four years. Cobalt prices have continued to remain at the higher levels. Decisions to reduce the quantity of cobalt seem to be based upon capitalizing on high market prices. Additionally, planning decisions assume an ability to reactivate a standby refinery to process scrap and

to reopen two 40-year old mines in Idaho and Missouri.[40] Although this may be possible, it brings an obvious question. If cobalt prices are currently at a premium due to decreased production in Zaire and the U.S. currently has no production, why have these two mines remained closed since the Korean War? While specific information regarding this issue is not readily available, the answer seems to lie in the fact that these mines produced lower grade cobalt ore than could be imported from South Africa. Tightening environmental requirements could also make their operation uneconomical even with higher market prices.[41] It does seem doubtful, however, these mines could produce the required 8,000,000 pounds per year of high grade cobalt to meet peacetime needs, let alone an increased wartime requirement (even without environmental restrictions). While there is reportedly about 5.3 million pounds of available scrap that could be recycled to supplement domestic mining during wartime, this is considerably short of a realistic three-year quantity.[42]

Platinum Group Metals

Platinum, a key component in defense and civilian electronics is mined almost exclusively outside of North America. South Africa has 75% of the world reserves and the former-Soviet Union holds the remaining portion. A small holding, less than one-tenth of one percent, lies in Canada.[43] Even with this lack of domestic production, Congress has authorized the disposal of more than 212,000 troy ounces of

platinum.[44] No discussion was offered in Congressional testimony relative to this sale. From an outsiders vantage however, this appears to be purely an issue to take advantage of potential economic gain for the Department of Defense. The issue of grade or quality is probably not a factor here since the U.S. maintains extensive refining capability--about 17 percent of the world's capacity.[45]

New Acquisitions

The stockpile manager, although restricted by Congress in many areas, has been able to keep pace by purchasing some of the minerals not previously held in large quantity. Increased acquisitions of such materials as beryllium, columbium, indium, tantalum, and titanium were approved in the 1993 Defense Appropriations Act. Also, as public scrutiny of the chromium subsidy increased, Congress approved the purchase of 21,000 tons of high grade chromium.[46]

V. ECONOMIC IMPACT OF MAJOR STOCKPILE SALES

While many of the minerals in the stockpile are no longer considered critical, the market impact of rapidly selling these minerals must be a prime concern. Potential sales have been carefully reviewed by the stockpile manager and require approval by Congress. Stockpile materials designated for disposal are sold through a sealed bid process in relatively small quantities. If the bids are not near the market price they are

rejected. Overall plans to modernize the stockpile call for sales to continue for approximately ten years so as to evenly distribute the market effect. Offerings are made in consistent semi-monthly, monthly, and bimonthly (varies with each mineral) lots which least disrupt the market. No major one-time sales have been or are planned which could cause knee-jerk reactions in the market. In the case of vegetable tannin and asbestos, sales have almost been impossible due to low market demand and may force these items to remain in the stockpile longer than desired.[47]

VI. THREE-YEAR WAR SCENARIO REVISITED

Even when faced with the fact that some materials in the stockpile are no longer considered critical, an important question remains unanswered. How can the Department of Defense reduce the stockpile to $444 million and still comply with the three-year war scenario directed by the 1979 Strategic and Critical Materials Stockpiling Revision Act? Are the 1985 NSC tactics being used again? Has Congress agreed to be an accomplice in order to gain revenue and disregard its own three-year war scenario stockpiling requirement? The answer to each of these questions is a quantifiable no! The new method being used reduces overall stockpile goals based on an assumption of three to five years of mobiization prior to entering a war.[48] Although this is an overly optimistic planning assumption, it was not specifically used in previous studies aimed at reducing

the stockpile. According to Colin McMillan, Assistant Secretary of Defense for Production and Logistics, in his testimony to the House of Representatives Committee on Seapower and Strategic and Critical Materials on 29 April 1992, a three to five-year warning of an impending emergency will be possible because

> Our warning times are significantly increased. Four years ago, warning times were measured in hours, and now they are measured in years....The primary reason for the decrease is that we will be reconstituting to a smaller force.[49]

Two major flaws appear in Mr McMillan's approach. First, the U.S. does not have a good track record of predicting major events--particularly not the type of prediction that would allow us to have three to five years to mobilize the defense industry. The bombing of Pearl Harbor, the extent of our involvement in Europe and the Pacific during World War II, the invasion of South Korea by North Korea, the invasion of Kuwait by Iraq, the extent of escalation in Vietnam, the fall of communism in Eastern Europe, the dissolution of the Soviet Union, and the breakup and fighting in Yugoslavia offer poor testimony to U.S. prediction capability.

Mr. McMillan's second thesis is that a reduction in U.S. forces will reduce the wartime requirement. In essence, he believes that fewer forces will require less logistics. He is correct in ascertaining that fewer forces require less logistics; this is absolutely true. What he has overlooked is that the United States, throughout history, has been primarily a limited militia during times of peace. During times of

conflict, as seen in World War I, Korea, World War II, Vietnam, and the Cold War, the size of the U.S. military increased dramatically, and of course with the personnel increases there were appropriate increases in the logistics requirements to supports those forces. In addition, as we have reduced the force structure we have also reduced the size of the hardware inventory. This should be clearly evident as fighter wing equivalents are being reduced from 36 to 20, the previous 600-ship Navy is being reduced to 331, and active Army divisions are being reduced from 18 to 10 with the possibility of even greater force structure cuts looming on the horizon.[50] While Mr. McMillan is to be commended for his attempt to modernize stockpile requirements, it is difficult to provide accolades for a situation that could possibly place the United States in grave danger if it does not have sufficient critical minerals on hand in the event of a national emergency.

VII. CONCLUSIONS

Initial public reaction to significant reductions in the National Defense Stockpile has been horror and dismay that the Department of Defense would sell off a critical piece of the insurance policy that will protect it if a future national emergency occurs. It appears inconceivable that the Defense Department would liquidate the very items it has taken years to accumulate to ensure America would never again be severed from critical minerals. Some of these fears may be well founded--

particularly in the case of minerals such as chromium, cobalt, platinum, titanium, bauxite, manganese and others that are almost totally imported. In many cases however, close examination of the quality and quantity of each of the materials being offered for sale, as well as the materials being purchased, reveals sound judgment and logic which appear to fully incorporate national security strategies while conducting a much needed modernization--a modernization that is long overdue. Specifically, sales of minerals such as asbestos, tannin, copper, zinc, lead, mercury, nickel, and tin, which are no longer required or for which there are suitable stable sources in North America, provide modernization and an accompanying reduction of stockpile operating costs.

There are two major exceptions to the modernization which must not be overlooked. First, a reduction of overall stockpile goals to a level of $444 million based on optimistic planning factors which assume a three to five-year period of mobilization seems unconscionable, especially when viewed in the light of our poor ability to predict world events in the past. Second, overly optimistic planning factors to assess the availability of minerals which the U.S. relies upon from unstable sources also seems contrary to a strong national defense posture.

The national investment in the stockpile is comparable to any insurance policy. If an emergency does not arise, there are always those who can say that a three-year supply of strategic and critical minerals was a waste. If, however, an emergency

does arise, overly optimistic planning assumptions will not guarantee the nation's defense.

The Department of Defense must consider the appropriateness of both the quantity and quality of each material stored in the stockpile to ensure that each tax dollar produces the necessary defense for the nation and that stockpile modernization trends keep pace with technology. Any reduction must be based on realistic planning which meets both the letter and intent of the 1979 Strategic and Critical Materials Stockpiling Act. Planned activities which base sales of critical minerals on overly optimistic planning assumptions and use the term "modernization" to camouflage direct or indirect attempts to use the stockpile contents for fiscal gain place the nation in jeopardy. A situation which can only be viewed as suicide for the United States if critical minerals are unavailable in times of a national emergency.

APPENDIX I
NATIONAL DEFENSE STOCKPILE STATUS

COMMODITY & UNIT	GOAL	ON HAND	SHORTAGE
1. Aluminum (ST)	700,000	2,082	Note 1
2. Alum Oxide Abras Grain (ST)	0	50,904	Note 1
3. Alum Oxide Fused Crude (ST)	0	249,867	Note 1
4. Antimony (ST)	36,000	36,006	0
5. Asbestos - Amosite (ST)	17,000	17,000	0
6. Asbestos Chrysotile (ST)	3,000	10,771	<+7,594>
7. Bauxite - Abrasive (LCT)	1,000,000	0	1,000,000 Note 1
8. Bauxite Met Grd, Jamaica (LDT)	21,000,000	12,457,740	19,754,260 Note 1
9 Bauxite Met Grd, Suriname (LDT)	6,100,000	5,299,597	800,403 Note 1
10.Bauxite Refractory (LCT)	1,400,000	274,229	1,125,771 Note 1
11. Beryl (ST)	18,000	17,856	0
12. Beryllium Copp Mstr Alloy (ST)	7,900	7,387	513
13. Beryllium Metal (ST)	400	297	103
14. Bismuth (LB)	2,200,000	2,081,355	118,645
15. Cadmium (LB)	11,700,000	6,328,570	5,371,430
16. Chromite -Chemical (SDT)	675,000	242,414	432,586
17. Chromite - Met (SDT)	3,200,000	1,775,496	1,424,504.
18. Chromite Refractory (SDT)	850,000	391,414	.58,5(6
19. Chromium-FerroHighCarbon(ST)	185,000	641,185	Note 2
20. Chromium-FerroLow Carbon(ST)	75,000	318,942	Note 2
21. Chromium Ferro Silicon (ST)	90,000	58,357	Note 2
22. Chromium Metal (ST)	20,000	3,763	Note 2
23. Cobalt (LB)	85,400,000	53,104,272	32,295,728
24. Columbium Carbide Powder (LB)	100,000	21,372	Note 3
25. Columbium Concentrates (LB)	5,600,000	2,019,217	Note 3
26. Columbium Ferro (LB)	0	930,911	Note 3
27. Columbium Metal Powder (LB)	0	44,851	Note 3
28. Copper (ST)	1,000,000	29,047	970,953 Note 4
29. Cordage Fiber - Abaca (LB)	155,000,000	0	155,000,000
30. Cordage Fiber - Sisal	60,000,000	0	60,000,000
31. Diamond Stones (KT)	7,700,000	7,777,225	<+77,225>
32. Diamonds - Bort (KT)	22,000,000	22,001,344	<+1,344>
33. Diamonds Dies Small (PC)	60,000	25,473	34,527 Note 5
34. Fibers - Natural Insulation (LB)	1,500,000	0	1,500,000
35. Flourospar Acid (SDT)	1,400,000	892,856	507,144
36. Flourospar - Met (SDT)	1,700,000	410,822	1,289,178
37. Germanium Metal (KG)	146,000	38,282	107,718
28. Graphite Nat Cey Lump (ST)	6,300	5,492	1,108
3.. Graphite Nat - Malagasy (ST)	20,000	17,835	2,165
40. Graphite O/T Cey Malagasy (ST)	2,800	2,803	0
41. Iodine (LB)	5,800,000	6,069,091	<+268,460>
42. Jewel Bearings (PC)	120,000,000	77,576,313	42,423,687
43. Lead (ST)	1,100,000	601,053	498,947
44. Manganese Chemical (SDT)	170,000	172,223	Note 6
45. ManganeseDioxide Bat Nat(SDT)	62,000	203,723	Note 6
46. Nanganese Dioxide BatSyn(SDT)	25,000	3,011	Note 6
47. Manganese Electrolutic (ST)	0	14,172	Note 6
48. Manganese Ferro Hi Carbon (ST)	439,000	812,157	Note 6
49. ManganeseFerroMed Carbon(ST)	0	29,057	Note 6
50. Manganese Ferro Silicon (ST)	0	23,574	Note 7

APPENDIX I (Continued)
NATIONAL DEFENSE STOCKPILE STATUS

COMMODITY & UNIT	GOAL	ON HAND	SHORTAGE
51. Manganese Met (SDT)	2,700,000	2,865,415	Note 6
52. Mercury (FL)	10,500	160,231	<+149,731>
53. Mica - Stained & Better (LB)	6,200,000	5,212,447	987,553
54. Mica 1st & 2d Qual (LB)	90,000	1,176,338	1,086,338
55. Mica MS (LB)	12,630,000	14,418,019	<+1,788,019>
56. Mica PB (LB)	210,000	130,745	79,255
57. Mica PS (LB)	930,000	1,505,504	<+575,504>
58. MorphineSulf/Analg Crude(AMA)	0	31,795	Note 7
59. MorphineSulf/Alag Refine(AMA)	130,000	39,508	Note 7
60. Nickel (ST)	200,000	37,214	162,786
61. Platinum (TrOz)	1,310,000	452,641	857,359
62. Platinum - Iridium (TrOz)	98,000	29,590	68,410
63. Platinum - Palladium (TrOz)	3,000,000	1,264,602	1,735,398
64. Pyrethrium (LB)	500,000	0	500,000
65. Quartz Crystals (LB)	600,000	1,787,229	1,187,229
66. Quinidine (Oz)	10,100,000	2,473,050	7,627,950
67. Quinine (Oz)	4,500,000	3,246,065	1,253,935
68. Ricinoleic/Sebacic Acid (LB)	8,800,000	5,009,697	3,790,303
69. Rubber (LT)	850,000	125,432	724,568
70. Rutile (SDT)	106,000	39,186	66,814
71. Sapphire & Ruby (KT)	0	16,305,502	<+16,305,502>
72. Silicon Carbide (ST)	29,000	66,842	37,842
73. Silver (TrOz)	0	98,174,473	Note 8
74. Talc (ST)	28	1,081	1,053
75. TantalumCarbide Powder (LBTA)	0	28,688	Note 9
76. Tantalum Metal Powder(LBTA)	0	201,133	Note 9
77. Tantalum Minerals (LBTA)	8,400,000	2,837,943	Note 9
78. Thorium Nitrate (LB)	600,000	7,107,687	<+1,107,687>
79. Tin (MT)	42,674	171,233	<+128,559>
80. Titanium (ST)	195,000	36,831	158,169
81. Tungsten Carbide Powder (LB)	2,000,000	2,032,942	Note 10
82. Tungsten Ferro (LB)	0	2,024,143	Note 10
83. Tungsten Metal Powder (LB)	1,600,000	1,898,831	Note 10
84. Tungsten Ores & Conc (LB)	55,450,000	76,356,957	Note 10
85. Vanadium (STV)	7,700	721	6,989
86. Vanadium Ferro (STV)	1,000	0	1,000
87. Vegetable Tannin Chestnut (LT)	5,000	11,851	<+6,851>
88. Vegetable Tannin QUE (LT)	28,000	122,844	<+94,844>
89. Vegetable Tannin Wattle (LT)	15,000	14,998	2
90. Zinc (ST)	1,425,000	378,760	1,046,240

Source: Hearings on National Defense Authorization Act for Fiscal Year 1991 - H.R. 4739

Notes

1. 50,904 ST of aluminum oxide Abrasive grain and 249,867 ST of aluminum oxide fused crude are being held as an offset against 379,253 LCT of bauxite abrasive grade.

2. 352,621 ST of chromium-ferro high carbon are being used as an offset against 881,855 SDT of the chromite metallurgical grade ore objective. 243,942 ST of chromium-ferro low carbon are being held against 609,855 SDT of the chromite metallurgical grade ore objective. 11,611 SDT of non-specification chromite metallurgical grade ore are being held against 11,611 SDT of the chromite metallurgical grade ore objective. 56,773 ST of non-specification chromium metallurgical grade ore are being held as an offset against 138,152 SDT of the chromite-chemical grade ore objective.

3. 930,911 lbs of columbium ferro are being used as an offset against 1,095,189 lbs of the columbium concentrate objective. 44,851 lbs of columbium metal powder are being used to offset 52,766 lbs of the columbium concentrate objective.

4. Copper inventroy includes 6,751 ST of copper contained in 9,645 ST of brass. Sinc inventroy includes 2,894 ST of zinc contained in 9,645 of brass. Brass slabs are 70% copper, 30% zinc.

5. Diamond stones and Bort diamonds offset any shortage appearing in in the small diamond dies catagory.

6. 21,989 SDT of manganese, battery grade, natural are being used to offset a shortfall of 21,989 SDT of manganese, synthetic dioxide. 14,172 ST of manganese metal electrolytic are being used as an offset for 42,433 SDT of the manganese metallurgical grade ore objective. 29,057 ST of manganese ferro medium carbon are being used as an offset against 58,114 SDT of metallurgical grade ore. 256,417 SDT of manganese ferro high carbon are being used to offset 512,834 SDT of the manganese metallurgical grade ore objective. The remaining 61,781 ST of manganese ferro high carbon is planned to be used as an offset for a reduction ore combined ore value in any desired combination.

7. 31,795 AMA lbs of morphine sulfate and analg crude are being used to offset 31,795 AMA lbs of the morphine sulfate and analg refined objective.

8. Public Law 97-35, for the disposal of silver, was suspended pending completion of the Department of the Interior study and additional legislative action. The silver inventory does not include 1,500,000 TrOz on loan to another Government Agancy.

9. 201,133 LbTa of tantalum metal powder is being used as an offset against 237,337 LbTa of the tantalum minerals objective. 28,688 LbTa of tantalum carbide powder is being used as an offset against 33,852 LbTa of the tantalum mineral objective.

10. 111,775 LbW non-specification grade tungsten carbide powder is ofsetting 78,243 LbW of the specification grade tungsten carbide powder objective. 47,194 LbW non-specification grade tungsten metal powder is used to offset 33,036 LbW of the specification grade tungsten metal powder objective. The remainder of the tungsten powder non-specification grade material is being held as an offset against 199,271 LbW of the tungsten ores and concentrates objective. 840,752 LbW tungsten ferro is used as an offset against 914,738 LbW of the tungstenores and concentrates objective. 1,184,609 LbW tungsten ferro non-specification grade is ofsetting 902,198 LbW of the tungsten ores and concentrates objective.

Abbreviations Used In Appendix 1 & 2

AMA LB - Anhydrous Morphine Alkloid (Pound)

FL	Flask (76 pound)
Kt	Karat
LB	Pound
LB Cb	Pounds of Contained Columbium
LBCo	Pounds of Contained Cobalt
LBTa	Pounds of Contained Tantalum
LBW	Pound of Contained Tungsten
LCT	Long Calcined Ton
LDT	Long Dry Ton
LT	Long Ton
MT	Metric Ton
PC	Piece
SDT	Short Dry Ton
ST	Short Ton
STV	Short Tons of Contained Vanadium
TrOz	Troy Ounces

APPENDIX II
STOCKPILE DISPOSALS REQUIRED BY H.R. 4695

Material Required for Disposal	Unit	Quantity
Aluminum Metal	ST	2,082
Aluminum Oxide, Abrasive Grain	ST	50,904
Aluminum Oxide, Abrasive Grain, NSG	ST	118
Aluminum Oxide, Fused Crude	ST	249,867
Analgesics	AMA LB	68,703
Antimony	ST	36,011
Antimony, NSG	ST	7
Asbestos, Amosite	ST	34,005
Asbestos, Amosite, NSG	ST	1
Asbestos, Chrysotile	ST	9,787
Asbestos, Chrysotile, NSG	ST	916
Bauxite, Metal Grade, Jamaica and Suriname	LDT	17,757,337
Bauxite, Refractory	LCT	207,067
Beryl Ore	ST	17,729
Beryllium Copper Master Alloy	ST	7,387
Bismuth	LB	1,825,955
Cadmium	LB	6,328,570
Chromite, Chemical & Matallurgical Grade Ore	SDT	1,551,262
Chromite, Chemical & Metal Grade Ore, NSG	SDT	217,441
Chromite, Refractory Grade Ore	SDT	232,414
Chromium, Ferro	ST	475,526
Chromium, Ferro, NSG	ST	18,990
Cobalt	LB CO	12,741,489
Columbium Group, NSG	LB CB	1,201,725
Copper	ST	29,047
Copper, NSG	ST	604
Diamonds, Industrial, Dies, Small	KT	12,737
Flurospar, Acid Grade	SDT	892,856
Flurospar, Acid Grade, NSG	SDT	899
Flurospar, Metallurgical Grade, NSG	SDT	100,822
Germanium	KG	715
Graphite, Natural, Ceylon, Amorphous Lump, NSG	ST	53
Graphite, Natural, Malagasy, Crystalline	ST	17,217
Graphite, Natural, Malagasy, Crystallien, NSG	ST	9
Graphite, Natural, Other than Ceylon & Malagasy	ST	1,933
Graphite, Natural, Other, NSG	ST	870
Industrial Diamond Bort	KT	14,020,961
Industrial Diamond Stones	KT	4,777,225
Iodine	LB	6,054,564
Iodine, NSG	LB	1,342
Jewel Bearings, NSG	PC	51,778,337
Lead	ST	601,043
Lead, NSG	ST	10
Manganese Ore, Chem & Met Grades	SDT	1,853,453
Manganese Ore, Chem & Met Grades, NSG	SDT	882,969
Manganese, Battery Grade, Natural Ore	SDT	169,511
Manganese, Battery Grade, Natural Ore, NSG	SDT	19,425
Manganese, Battery Grade, Synthetic Dioxide	SDT	3,011

APPENDIX II (Continued)
STOCKPILE DISPOSALS REQUIRED BY H.R. 4695

Material Required for Disposal	Unit	Quantity
Manganese, Ferro	ST	786,228
Manganese, Metal Electrolytic	ST	14,172
Mercury	FL	156,853
Mercury, NSG	FL	3
Mica, Muscovite Film, 1st & 2d Quality	LB	1,155,698
Mica, Muscovite Film, 1st & 2d Quality, NSG	LB	640
Mica, Muscovite Splittings	LB	14,355,260
Mica, Muscovite, Block, Stained & Better	LB	4,699,701
Mica, Muscovite, Block, Stained & Better, NSG	LB	206,730
Mica, Phlogopite Block, NSG	LB	114,027
Mica, Phlogopite Splittings	LB	1,486,596
Nickel	ST	37,214
Platinum Group Metals, Iridium	TR OZ	15,136
Platinum Group Metals, Palladium	TR OZ	1,262,387
Platinum Group Metals, Palladium, NSG	TR OZ	2,214
Platinum Group Metals, Platinum	TR OZ	199,247
Platinum Group Metals, Platinum, NSG	TR OZ	13,043
Quinidine	AV OZ	2,471,359
Quinidine, NSG	AV OZ	1,691
Quinine	AV OZ	2,770,115
Quinine, NSG	AV OZ	475,950
Rutile	ST	39,130
Rutile, NSG	ST	56
Sapphire & Ruby	KT	16,305,502
Sebacic Acid	LB	5,009,697
Silicon Carbide	ST	45,080
Silver	TR OZ	83,951,492
Talc	ST	1,081
Tantalum Group, NSG	LB TA	1,152,259
Thorium Nitrate	LB	7,097,687
Tin	MT	165,780
Titanium Sponge, NSG	ST	10,866
Tungsten Group	LB W	27,530,759
Tungsten Group, NSG	LB W	23,805,427
Vanadium Group	ST V	721
Vegetable Tannin, Chestnut	LT	11,692
Vegetable Tannin, Quebracho	LT	121,642
Vegetable Tannin, Wattle	LT	14,997
Vegetable Tannin, Wattle, NSG	LT	1
Zinc	ST	378,768

Source: National Defense Authorization Act FY 1993 - H.R. 4695

END NOTES

1. United States At Large 1946, p.596
2. Bennett p.3 and Heivilin p.50
3. Heivilin, p.50
4. See McMillan's Congressional testimony, p.7
5. Schmitt, p.16. Extensive discussions are contained in both the 1992 and 1993 Secretary of Defense Report to Congress on National Defense Stockpile Requirements
6. United States At Large 1946, pp.596-597
7. White, p.190
8. Lowndes, p.7
9. United States At Large, p.319
10. United States General Accounting Office, 1986 Study, p.4
11. Lowndes, p.54
12. Heivilin, p.50
13. Ibid
14. Schmitt, p.16
15. Ibid, p.16
16. U.S. General Accounting Office, 1986 Study, p.6
17. U.S General Accounting Office, 1987 Study, pp.22
18. Ibid, p.22
19. Ibid, p.20
20. Ibid, p.17
21. Ibid, p.17
22. U.S. General Accounting Office, 1986 Study, p.15-17
23. See Thomason, et.al. Phase I: Development and Analyses
24. Ibid, p.III-2
25. Ibid, pp.IV-3

26. Ibid, p.I-3

27. Heivilin, p.50

28. Morgan, pp.78-102

29. Abrahamson, p.8. Also, R.M. Bunting, Vice President of U.S. Tungsten Corporation, in his testimony to Congress,

30. Oxaal, p.150

31. Papp, pp.5,41

32. Ibid, p.8

33. See McMillan's 29 April 1992 Congressional testimony, p.8

34. See H.R. 4695, pp.4-5 for a complete listing of materials that DoD is required to purchase.

35. Morgan, p.87

36. See McMillan's 29 April 1992 Congressional testimony, p.8

37. Shedd, p.1

38. Shedd, p.3

39. Ibid, p.4

40. Morgan, p.113

41. Shedd, p.4

42. Morgan, p.113

43. Ibid, p.91

44. H.R. 4695, p.3

45. Morgan, p.91

46. McMillan Congressional testimony, p.8

47. Ibid, p.12

48. Schmitt, p.16

49. McMillan, pp.8-9

50. See Current Service POM's

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